

Notice of Allowability

Application No.

10/623,900

Examiner

Anthony Fick

Applicant(s)

KUKULKA ET AL.

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to applicant's amendment of 5/31/07.
2. ☒ The allowed claim(s) is/are 1,3,4 and 6-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

Remarks

1. Applicant's amendments to the claims have overcome the previous objections. The objections are withdrawn.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Carmen Santa Maria on July 31, 2007.

The application has been amended as follows:

- a) Claim 1, line 13: "a diffusion layer" has been replaced by the following – a diffusion layer, wherein the diffusion layer is gold, – .
- b) Claim 1, line 19: "contact" has been replaced by the following – contact. – .
- c) Claim 5 has been cancelled.
- d) Claim 10, line 15: "a diffusion layer" has been replaced by the following – a diffusion layer, wherein the diffusion layer is gold, – .

Allowable Subject Matter

3. Claims 1, 3, 4 and 6 through 20 are allowed.
4. The following is an examiner's statement of reasons for allowance: the present claims are directed to a solar cell structure that includes a multilayer front electrical

Art Unit: 1753

contact, the front contact including a titanium layer, a gold diffusion layer, a barrier layer and a joining layer. The closest prior art is to Lindmayer (U.S. 4,124,455) and Yin et al. (U.S. 5,103,268).

Lindmayer discloses a method of making solar cells with multiple-metal contacts. Lindmayer discloses a solar cell comprising an active semiconductor structure, a back electrical contact and a front electrical contact (column 1, paragraph 3). Lindmayer further discloses the front contact has multiple layers comprising a titanium layer contacting the solar cell, a layer overlying the titanium layer of titanium group metal mixed with platinum group metal, a third layer of platinum group metal, and a silver layer overlying the platinum group metal layer (column 3, paragraph 1). As the present specification states that platinum and palladium are barrier-layer metals and silver is a joining layer metal, the third and fourth layers of Lindmayer are deemed a barrier layer and a joining layer. Further, the metals contained in the second layer will diffuse into neighboring layers and thus it is the position of the examiner that this layer can be considered a diffusion layer.

Yin teaches an interfacial electrode layer for semiconductor devices shown in figures 2A, 2B and 2C. The interfacial electrode comprises layers of metals including an ultrathin layer of titanium attached to the semiconductor, with a thicker layer of a fixable metal such as gold overlying the thin layer of titanium.

The reference to Lindmayer does not disclose the use of gold as the diffusion layer of the instant claims, but instead using a mixture of titanium and platinum group metal as a buffer region to improve the contact between the titanium layer and the

Art Unit: 1753

platinum group layer. While Yin does teach the use of gold layers on top of titanium, the combination of Yin and Lindmayer would not create the instant invention. Replacing the buffer region of Lindmayer with gold would destroy the invention of Lindmayer for promoting the adhesion between the titanium and platinum group layers. Also, the reference to Yin does not teach further layers of barrier and joining layers above the gold layer and do not provide motivation to place the layer beneath the platinum and silver layers of Lindmayer. Therefore, altering the references to arrive at the present invention would destroy the prior art and would not be obvious. Thus the claims are allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

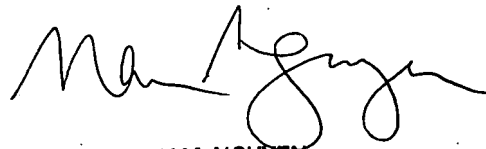
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday - Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick *ADF*
AU 1753
August 17, 2007


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700